

F. Thickness Tolerances

Determine the thickness by measuring the fresh concrete depth at the shoulder edges at least every 500 ft (150 m) of shoulder length.

The Engineer will evaluate areas deficient by more than 1 in (25 mm) thick. If the Engineer requires removal, remove and replace the shoulder pavement in full cross sections according to Plan requirements.

If removal and replacement are not required, payment is made at 50 percent of the Contract Unit Price for areas deficient by more than 1 in (25 mm). Areas that are deficient by more than 0.5 in (13 mm) through 1 in (25 mm) will be paid for at 70 percent of the Contract Price per square yard (meter).

440.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

440.4 Measurement

The work to be paid for under this Item is the number of square yards (meters) of Portland cement concrete shoulders completed and accepted as measured in place. The measurement width is the shoulder width shown on the Plan typical cross-section. The measurement length is along the surface at the inside edge of the paved shoulder.

440.4.01 Limits

General Provisions 101 through 150.

440.5 Payment

The work will be paid for at the Contract Unit Price per square yard (meter). Payment is full compensation for providing materials, reinforcement, equipment, and labor, mixing, hauling, handling, placing, and providing incidentals to complete the work.

Payment will be made under:

Item No. 440	Plain Portland cement concrete shoulders, type____	Per square yard (meter)
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440.5.01 Adjustments

The Contract Unit Price per square yard (meter) of concrete shoulder will be adjusted for concrete shoulder accepted with a 28-day compressive strength or thickness deficiency.

If a shoulder section is deficient in thickness and compressive strength, the Contract Unit Price will be adjusted by the total reduction of the application of the two individual percentages shown in the Pay Factor Schedule and Subsection 440.3.06.F, "Thickness Tolerances."

For combined deficiencies of 50 percent or more, the Engineer may allow the shoulder to stay in place or require its removal. If the Engineer requires shoulder pavement removal, the original pavement nor its removal will be paid for. Pavement replaced satisfactorily will be paid for at the appropriate Unit Price.

Section 441—Miscellaneous Concrete**441.1 General Description**

This work includes placing Portland cement concrete as follows:

- As slope paving on end rolls, cut slopes, paved ditches, spillways, and ditch slopes
- In median pavement
- As sidewalks
- In concrete curbs, gutters, curb and gutters, and valley gutters
- As nonreinforced headwalls
- As velocity dissipators and concrete slope drains
- As concrete spillways
- Curb cut wheel chair ramps

- At other locations designated on the Plans or as directed

This work includes subgrade preparations including:

- Fine grading and backfilling
- Forming, furnishing, placing, and finishing concrete
- Constructing weep holes and furnishing and placing the coarse aggregate
- Furnishing and placing preformed joint fillers as shown on the Plans
- Placing driveway concrete as shown on the Plans. Nominal 4 in (100 mm) or 6 in (150 mm) thick as specified or to match existing pavement.

441.1.01 Definitions

General Provisions 101 through 150.

441.1.02 Related References

A. Standard Specifications

Section 209—Subgrade Construction

Section 430—Portland Cement Concrete Pavement

Section 500—Concrete Structures

Section 832—Curing Agents

Section 833—Joint Fillers and Sealers

Section 853—Reinforcement and Tensioning Steel

B. Referenced Documents

General Provisions 101 through 150.

441.1.03 Submittals

General Provisions 101 through 150.

441.2 Materials

Use concrete that conforms to the minimum requirements for Class “B,” as specified in Section 500, except that a one-bag mixer may be used. The requirements of Subsection 500.1.03.G, “Cold Weather Concrete Curing and Protection Plan” and Subsection 500.3.05.X, “Pour Concrete in Cold Weather” for cold weather concrete placement are deleted.

Place miscellaneous concrete only when the air temperature is 40 °F (4 °C) and rising. Protect concrete from freezing for the first 24 hours. Hand finishing is allowed.

Other materials and their Specifications are as follows:

Material	Section
Steel Bars for Concrete Reinforcement	853.2.01
Membrane Curing Compound, Type 2	832.2.03
Dowel and Tie Bars and Reinforcing Steel	853.2.03
Joint Fillers and Sealers	833
Welded Steel Wire for Concrete Reinforcement	853.2.07

441.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

441.3 Construction Requirements

441.3.01 Personnel

General Provisions 101 through 150.

441.3.02 Equipment**A. Forms**

Forms are subject to the Engineer's approval. Use forms that are:

- Wood or metal that is readily available
- Straight and oiled before each use

Use metal divider plates and templates.

Use the slip form placement method when applicable. If the slip form method does not produce a product with the proper quality, shape, grade, or alignment, the Engineer may require using fixed forms.

B. Weep Holes

Provide weep hole drain pockets filled with coarse aggregate to use with weep hole drain pipe or formed openings according to the Plan details.

441.3.03 Preparation

Before placing the concrete, excavate for toe walls, edge walls, and weep hole drain pockets; place coarse aggregate in weep hole drain pockets; and grade, finish, and compact the subgrade surface. Use mechanical tamps for compaction if necessary.

441.3.04 Fabrication

General Provisions 101 through 150.

441.3.05 Construction**A. Extent and Thickness of Pavement**

See the Plans to determine the areas to be paved and the dimensions.

Thicknesses are subject to a minus tolerance of 0.5 in (13 mm). Do not perform overlay pours.

B. Preparation of Subgrade

Finish the subgrade for miscellaneous concrete to the line and grade on the Plans and the following:

1. Compact the subgrade to the same degree as the roadway on which it is placed. Compact the subgrade according to Section 209.
2. If a Contract involves a Roadway and a Bridge Contractor, the Roadway Contractor shall complete the grading for the slope paving.
The Bridge Contractor shall complete final grading, compacting, dressing, placing, and maintenance to the structures until completion.
3. When placing paving on the front slopes of ditches and shoulders, place any required special materials during the roadway construction.
4. Do not excavate for velocity dissipators, spillways, and slope drains below the foundation elevation. Do not excavate wider than necessary to provide working space or to remove soft, unsuitable material. Backfill with selected material.
5. When fitting spillways to concrete pavement, set the specified dowel bars into the pavement when it is laid. Use metal parting strips to hold the ends of dowels bent into the grooves.

C. Concrete**1. Mixing**

Mix Class B concrete as specified in Section 500 with the following exceptions:

- a. Use of small capacity job-site batchers and one-bag mixers is allowed. The rate of concrete placement in Subsection 500.3.05.P, "Meet the Minimum Placement Rates" is waived for miscellaneous concrete.
- b. Proportion concrete ingredients volumetrically if the Engineer has approved equipment calibration and operation and the operator is certified by the Office of Materials and Research.

2. Placing and Finishing

Place and finish concrete as follows:

- a. Deposit concrete within forms or against other pavements on a compacted and wetted subgrade to the depth to produce the specified thickness.

NOTE: Do not place concrete on a muddy or frozen surface.

- b. Vibrate the headwalls.
- c. Strike off the concrete to a plane surface and finish it with a Type IV or Type V finish as defined in Subsection 500.3.05.AB, “Finish Concrete” and complete the following:
 - 1) **Concrete Slope Paving.** Give a final finish with a stiff-bristle broom. With the Engineer’s approval, mechanically convey the concrete to the forms.
 - 2) **Concrete Sidewalks.** Give a Type V finish unless otherwise noted on the Plans. Test the surface with a 10 ft (3 m) straightedge laid parallel to the center line. Eliminate irregularities greater than 0.25 in (6 mm) per 10 ft (3 m) while the concrete is still plastic.
Ensure that concrete sidewalk constructed as curb cut (wheelchair) ramps has a rough or textured finish.
 - 3) **Concrete Paved Ditches.** Ensure that the surface of the bottom and sides of paved ditches are uniform and true to grade and cross section.
Ensure that straight-grade tangents do not deviate more than 1 in (25 mm) within 10 ft (3 m) when tested with a 10 ft (3 m) straightedge. Do not allow deviation if it reduces the ditch paving thickness, causes water to pond, or alters the direction of flow.
Finish the ditch paving by floating with wood or metal floats to bring mortar to the surface to cover the coarse aggregate.
Use reinforcing that conforms to Plan details if required.
 - 4) **Concrete Curbs, Gutters, and Median.** Finish according to Subsection 441.3.05.C.2, “Placing and Finishing.” Remove face forms as soon as possible and finish the exposed surfaces with a wood float.
Use a straightedge to test the edge of the gutter and top of the curb and median to conform to the requirements for the adjacent pavement. Irregularities shall not exceed 0.25 in (6 mm) in 10 ft (3 m).
Place the curb and gutter using a machine as long as the results are satisfactory.
 - 5) **Curb Cut Wheel chair Ramps.** Construct a Type I, II, or III ramp according to Georgia Standard 9031W. Tie ramps into adjacent paved or unpaved sidewalk and use a rough or textured finish.

3. Joints

Follow these procedures to construct joints on slopes, ditches, sidewalks, and curbs, gutters, and medians.

a. Slope Paving

Place paving on slopes in horizontal or vertical courses, but not a mixture of both.

- 1) Construct horizontal courses approximately level and at least 3 ft (1m) but no more than 6 ft (1.8 m) wide measured along the slope.
When needed, construct trapezoidal courses at the top and bottom to accommodate sloping berm and ditch line conditions.
- 2) Edge the paving at construction joints between courses with a 0.25 in (6 mm) radius tool.
- 3) Provide vertical contraction or construction joints spaced along the horizontal course at right angles to the horizontal construction joints at approximately 40 ft (12 m) intervals, in line not staggered.
No other vertical lines will be required in horizontal courses.
When using vertical contraction joints, cut them with a tool one-third the depth of the paving during the finishing operation. Edge the contraction joints the same as construction joints.
Vertical courses approximately equal and at least 3 ft (1 m) but no more than 5 ft (1.5 m) wide across the plane of the slope. The desired width is 4 ft (1.2 m). Horizontal lines are not required in vertical courses.
Separate slope paving from the masonry of structures, sidewalks, curbs, and rigid-type roadway pavements of preformed joint filler that are 0.5 in (13 mm) thick.

b. Concrete Paved Ditches

Form joints in concrete paved ditches as follows:

- 1) Space contraction joints at 30 ft (9 m) intervals.
- 2) Place expansion joints only where the paved ditch joins the roadway pavement or some other structure.
- 3) Do not use joint sealers for expansion or contraction joints.

c. Concrete Sidewalk

Form transverse contraction joints using a tool designed to form a groove one-third the depth of the sidewalk at intervals shown on the Plans.

Where sidewalks abut the curb and gutter, ensure that alternate joints coincide. Round the edges with a 0.25 in (6 mm) edger. Make expansion joints according to the materials, dimensions, and locations specified on the Plans.

d. Concrete Curbs, Gutters, and Medians

Form contraction joints or expansion joints on curbs, gutters, and medians.

- 1) **Contraction Joints.** Ensure that joints in curb, gutters, and medians are spaced the same as the joints in paving. Form joints by using metal divider plates or sawing them as in Section 430.

Form joints at least one-fifth but not greater than one-fourth the depth of the concrete. Except for sawed joints, finish the joints with a 0.25 in (6 mm) edging tool.

For curbs, gutters, and medians adjacent to pavement other than concrete, contraction joints shall be as follows:

- For header curb and combination curb and gutter, install contraction joints spaced no more than 20 ft (6 m) apart.
- For gutter median, install a contraction joints spaced no more than 20 ft (6 m) apart.

- 2) **Expansion Joints.** Form expansion joints according to the Plan details or as directed. Ensure that they coincide with the expansion joints in the adjoining pavement or gutter.

Cut the joint fillers to the same cross section as the construction. Trim flush the material that protrudes after the concrete is finished.

When miscellaneous concrete items are not adjacent to concrete construction, provide expansion joints at an interval of at least 500 ft (150 m).

e. Curb Cut Wheelchair Ramps

Locate and form expansion joints for curb cut wheelchair ramps according to Georgia Standard 9031W for ramp Type I, II, or III.

4. Curing

Use curing methods specified in Subsection 430.3.05.L, "Cure the Concrete." Ensure that the membrane curing compound is Type 2, if used. Pack honeycombed areas immediately after removing the forms.

D. Backfilling

Backfill the areas as soon as possible without damaging the work.

E. Clean-Up

When concrete work is complete, clean each surface. Protect the work from stains or other damage until Final Acceptance.

441.3.06 Quality Acceptance

General Provisions 101 through 150.

441.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

441.4 Measurement**A. Concrete Slope Paving**

Concrete slope paving is measured for payment in square yards (meters) of accepted surface area of paving of the specified thickness. Concrete in toe or edge walls, excavation, backfill, weep holes, and aggregates are not measured for separate payment.

B. Concrete Sidewalks

Concrete sidewalks are measured in square yards (meters) of the specified thickness, complete in place and accepted. The length is the actual measured length along the surface. The width is the Plan width or as directed. Excavation and backfill are not measured separately for payment.

C. Concrete Paved Ditches

The area measured for payment is the square yards (meters) of exposed surface area, exclusive of top edges, of the specified thickness placed according to the Plans or as directed. Reinforcing steel, excavation, preparation of subgrade including Type I backfill, forms, and concrete in toe or edge walls are not measured separately for payment.

Type II backfill, when required, will be paid according to Section 207.

D. Concrete Curbs, Gutter, Median, Pavement, and Combination Curb and Gutter

The following are measured by the linear foot (meter) along the face of the curb:

- Concrete curb and gutter
- Concrete curb
- Concrete header curb

The following are measured by the square yard (meter) or by the linear foot (meter), whichever is specified:

- Concrete gutter
- Concrete valley gutter
- Concrete valley gutter with curb
- Concrete median pavement
- Concrete gutter with raised edge

The length used to compute the square yards (meters) or linear foot (meter) is measured along the center line of the gutter. The width is the total width of the gutter including the curb or raised edge. Concrete doweled integral curb includes dowels.

E. Concrete Headwalls

Headwalls are measured for payment according to Subsection 500.4.01.B, "Payment per Cubic Yard (Meter)" and Subsection 500.5.01.E, "Filler Concrete." Filler concrete, where required, will be paid for at 60 percent of the Contract Unit Price for Class B concrete.

F. Concrete Spillways

Concrete spillways regardless of the type specified are measured by the actual number poured complete and accepted.

G. Concrete Slope Drains

Concrete slope drains are measured in square yards (meters) along the surface, complete and accepted.

H. Velocity Dissipators

Velocity dissipators are measured in square yards (meters), surface measure, complete and accepted.

I. Concrete Driveways

Driveway pavement is measured along the surface from the paving edge or back of the curb to where old and new concrete join. The width is the average width constructed.

J. Curb Cut Wheelchair Ramps

For new construction, curb cut wheelchair ramps will not be measured. For new construction, linear feet (meters) of curb and gutter will include the transitioned curb in front of ramps and square yards (meters) of concrete sidewalk will include ramps. No additional payment will be made for curb cut ramps.

For existing sidewalks, curb cut wheelchair ramps are measured as the actual number formed and poured, complete and accepted. No additional payment will be made for sawing existing sidewalk and removal and disposal of removed material for new ramp construction.

441.4.01 Limits

General Provisions 101 through 150.

441.5 Payment

These Items, measured as specified above, will be paid for at the Contract Unit Price per each, per square yard (meter), per linear foot (meter), or per cubic yard (meter).

441.5.01

Payment will be made under:

A. Slope Paving

Item No. 441	Concrete slope paving <u>[thick]</u> in (mm)	Per square yard (meter)
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B. Sidewalks

Item No. 441	Concrete sidewalk <u>(thick)</u> in (mm)	Per square yard (meter)
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C. Concrete Ditches

Item No. 441	Plain concrete ditch paving <u>(thick)</u> in (mm)	Per square yard (meter)
Item No. 441	Reinforced concrete ditch paving <u>(thick)</u> in (mm), including reinforcing steel	Per square yard (meter)

D. Curbs, Gutters, Combination Curb and Gutter, Headers, and Medians

Item No. 441	Concrete curb and gutter, <u>(thick)</u> in (mm)x <u>(width)</u> in (mm)type____	Per linear foot (meter)
Item No. 441	Concrete header curb, <u>[height]</u> in (mm), type____	Per linear foot (meter)
Item No. 441	Concrete valley gutter, <u>[thick]</u> in (mm)	Per square yard (meter)
Item No. 441	Concrete valley gutter with curb, <u>[thick]</u> in (mm)	Per square yard (meter)
Item No. 441	Concrete gutter with raised edge, <u>[thick]</u> in (mm)	Per square yard (meter)
Item No. 441	Concrete median <u>[thick]</u> in (mm)	Per square yard (meter)
Item No. 441	Concrete median, corrugated <u>[thick]</u> in (mm)	Per square yard (meter)
Item No. 441	Concrete doweled integral curb, type____ including dowels	Per linear foot (meter)

E. Spillways, Drains and Velocity Dissipators

Item No. 441	Concrete spillway type____	Per each
Item No. 441	Concrete slope drain	Per square yard (meter)
Item No. 441	Velocity dissipators	Per square yard (meter)

F. Headwalls

Item No. 441	Concrete headwalls	Per cubic yard (meter)
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G. Driveway Concrete

Item No. 441	Driveway concrete____ in (mm)thick	Per square yard (meter)
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H. Curb Cut Wheelchair Ramps

Item No. 441	Curb cut wheelchair ramps, Type____	Per each
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441.5.01 Adjustments

General Provisions 101 through 150.